

REMARKS/ARGUMENTS

This Preliminary Amendment accompanies a Request for Continued Examination filed under 37 CFR 1.114 in response to a Final Office Action mailed September 29, 2003. A Request for a One-Month Extension of Time under 37 CFR 1.136(a) is filed herewith, along with the fee prescribed by 37 CFR 1.17(a)(1). The response is therefore timely.

In the Final Office Action, claims 45-50 were rejected as anticipated by any of the following references: US 5,985,385 – Gottfried; US 5,967,699 – Knapp; EP 188,358; WO 98/19018; and GB 2,335,248. In response, applicant has amended claims 45-47, 49, and 50, and has added new claims 51-58. Claim 48 has been canceled. As explained below, it is respectfully submitted that claims 45-47, 49, and 50, as amended, are patentable over the art of record, as are new claims 51-58. Reconsideration is respectfully requested.

The undersigned attorney, on behalf of the applicant, wishes to thank Examiner Singh for the courteous and helpful telephonic interview that took place on January 21, 2003. The substance of the interview is summarized below.

In the telephonic interview, the rejection of claims 45-50 was discussed. It was pointed out to the examiner that neither the European reference, nor the Gottfried patent, nor the Knapp patent relate in any way to a mechanism for reducing vortex-induced vibrations (VIV). The examiner contended that the structural limitations in the claims read on these references, and that the recitation of a VIV reduction function in the claims is a functional limitation that would be given no weight in determining the patentability of an apparatus claim. Applicant contended that these references were non-analogous art and were therefore not properly cited. No agreement was reached on this point, although the examiner expressed the view that defining the invention explicitly as a “vortex-induced vibration reduction mechanism” might cause him to reconsider this position. It was, however, agreed that the British reference and the WIPO reference disclose VIV reduction structures.

With respect to claim 45, it was agreed that neither the British reference nor the WIPO reference teaches or suggests a plurality of columnar segments, each having “a vertical surface discontinuity oriented substantially parallel to the axis of the structure.” Therefore, it was agreed that if claim 45 were amended so that its structural limitations did not read on the Knapp, Gottfried, and European references, it would be allowable over the art of record.

Accordingly, claim 45 has been amended to define the invention as a “vortex-induced vibration (VIV) reduction mechanism.” Furthermore, the surface discontinuities in the columnar segments are now defined explicitly as “vortex-shedding.” These limitations clearly define patentably over the Knapp, Gottfried, and European references, none of which even hints at any vortex-shedding structure. Accordingly, it is respectfully submitted that claim 45 is patentable over the art of record, along with claims 46 and 47, which depend from it.

New claims 57 and 58 depend from claim 45, and further define the novel vortex-shedding structure of the invention. These claims define the structure shown, for example, in Figs. 5-8, 19, and 20 of the application. It is respectfully submitted that none of the cited references teaches or suggests a vortex-shedding structure of the type defined in these two claims. In particular, there is no teaching or suggestion in the art of record of a vortex-shedding structure formed of a plurality of columnar segments, each of which has a radius that varies in length between two vortex-shedding surface discontinuities. It is therefore respectfully submitted that claims 57 and 58 define patentably over the art of record.

Claim 49 relates to the embodiment of the invention shown in Figs. 24-29. Like claim 45, discussed above, claim 49 has been amended to define the invention explicitly as “a vortex-induced vibration (VIV) reduction mechanism.” This claim has been further amended to define the columnar segments as being of “an identical cross-sectional shape,” with adjacent segments being angularly offset from each other “by about 45 degrees,” whereby the segments form “a VIV-reducing structure.” Support for the “45 degrees” limitation is found in the second and third paragraphs on page 22 of the specification. It is respectfully submitted that neither the British nor the WIPO reference teaches a VIV-reducing structure formed from a plurality of segments, each having an identical non-circular cross-section, and offset from each other by an angle of about 45 degrees. Furthermore, as mentioned above, the remaining references contain no suggestion of any VIV-reducing structure. Therefore, it is respectfully submitted that claim 49, as amended, defines patentably over the art of record.

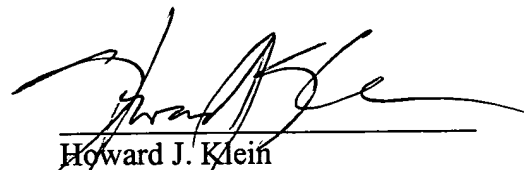
New claims 51-53 depend from claim 49, and they define the particular non-circular shapes disclosed in the application for this embodiment of the invention. None of the references teaches or suggests a VIV-reduction structure formed from columnar segments with any of these shapes. Therefore, it is respectfully submitted that claims 51-53 are allowable.

Claim 50 relates to the embodiment of the invention shown in Figs 30-35 of the application. Like the claims discussed above, it has been amended to define the invention explicitly as “a vortex-induced vibration (VIV) reduction mechanism.” It has been further amended to define the columnar segments as being “identical” in cross-sectional shape. Finally, it has been amended to recite the plurality of segments “defines a discontinuous, VIV-reducing exterior surface comprising a series of vortex-shedding discontinuities arranged in a stepped pattern along the length of the structure.” It is respectfully submitted that both the British and WIPO references teach the use of a helical flute or vane, and neither suggests a “stepped pattern” of vortex-shedding discontinuities. Furthermore, as mentioned above, the remaining references contain no suggestion of any VIV-reducing structure. Therefore, it is respectfully submitted that claim 50, as amended, defines patentably over the art of record.

New claims 54-56 depend from claim 50, and they define the particular non-circular shapes disclosed in the application for this embodiment of the invention. None of the references teaches or suggests a VIV-reduction structure formed from columnar segments with any of these shapes. Therefore, it is respectfully submitted that claims 54-56 are allowable.

In summary, it is respectfully submitted that claims 45, 46, 47, 49, and 50, as amended, define patentably over the art of record, as do new claims 51-58, for the reasons set forth above. Passage of the application to issue is therefore respectfully requested.

Respectfully submitted,
Klein, O'Neill & Singh, LLP
(Customer No. 22145)



Howard J. Klein
Reg. No. 28,727
2 Park Plaza, Suite 510
Irvine, California 92614
Tel.: (949) 955-1920
Fax: (949) 955-1921
hjklein@koslaw.com